REMARKS/ARGUMENTS

STATUS OF THE APPLICATION

Claims 1-11 were pending in this application and examined.

Claims 1-9 are rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. Claims 2, 4, and 11 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regards as the invention. Claims 1-5 and 8-11 are rejected under 35 U.S.C. §102(a) as being anticipated by Popovic et al. ("Interactive Manipulation of Rigid Body Simulations" ACM July 2000; hereinafter "Popovic"). Claims 6 and 7 are rejected under 35 U.S.C. §103(a) as being unpatentable over Popovic in view of Thalmann et al. ("Computer Animation" ACM 1996; hereinafter "Thalmann").

Applicants have amended claims 1-4, 8, 9, and 11, and added new claims 12-20. Claims 1-20 remain pending in this application after filing of this amendment. Applicants have amended the specification to correct inadvertently introduced typographical errors. Applicants submit that no new subject matter has been introduced by the amendments.

THE SPECIFICATION

The specification has been amended to correct inadvertently introduced typographical errors. Applicants submit that no new subject matter has been introduced by the amendments.

THE DRAWINGS

Although Figs. 1a and 1b are described in the "Description of Related Art" section of the specification, no admission is made in the specification that these figures are prior art. These figures represent a kinematic character having dynamic elements and the kinematic character when it undergoes unrealistic motion.

THE CLAIMS

Rejections under 35 U.S.C. § 112, first paragraph

Claims 1-9 are rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. The Office Action contends that there is no clear description of the Inertial Field Generator in relation to the claims. Applicants submit that claims 1-9 comply with 35 U.S.C. § 112, first paragraph, for at least the reasons stated below.

Claims 1-9 recite methods for simulating the relative motion of objects in computer animation. The claimed subject matter recites methods for controlling the motion of a dynamic object in response to the motion of a kinematic object, for example, when the motion of the kinematic object exceeds a threshold.

As described in the "Background" section of the specification, a kinematic object is generally an object whose motion is specified by for example an animator. A dynamic object (also sometimes referred to as a "secondary element") is an object whose motions may be responsive to the kinematic object. Examples of dynamic objects are clothing, hair, etc. As indicated in paragraph **[0003]** of the specification, the motion of a dynamic object is often too complex for the animator to directly control. Instead, physically-based numerical techniques are used to simulate motions of dynamic objects. As described in paragraph **[0004]** of the specification, this is accomplished by modeling the physical properties of the dynamic objects.

Kinematic and dynamic objects often interact in which case the motion of the dynamic object is influenced by the motion of the kinematic object. For example, as described in the "Background" section of the specification, the motion of the superhero (kinematic object) affects the motion of the superhero's cape (dynamic object). In certain scenarios, the kinematic object may be animated in a physically exaggerated manner, e.g., the superhero abruptly accelerates upward at 100Gs. Without the motion control techniques recited in the claims, the resultant motion of the dynamic object (e.g., the superhero's cape) would have a undesirable effect (even though the motion would en physically correct). (See specification: paragraphs **[0006]**, **[0007]**, **[0008]**, and **[0009]**).

Claims 1-9 recite methods for manipulating the motion of a dynamic object in response to motion of a kinematic object to prevent such undesirable effects. The Inertial Field

Generator (IFG) described in the specification provides a technique for controlling the motion of dynamic objects recited in the claims. For example, as described in paragraph **[0021]** of the specification, the use of the IFG allows an animator to control how a kinematic element's motions affects the simulation of the dynamic elements. The IFG described in the specification thus enables the control of the dynamic object as recited in the claims. The methodology used to apply the IFG to selectively manipulate the motion of dynamic objects is depicted in Fig. 2 and the accompanying description in the specification. Paragraphs **[0027]** through **[0037]** describe how the dynamic objects and the IFGs are modeled and used to manipulate the motions of dynamic objects.

Based upon the above, Applicants respectfully submit that claims 1-9 are enabled by the specification. Applicants therefore request reconsideration and withdrawal of this rejection.

Rejections under 35 U.S.C. § 112, second paragraph

Claims 2, 4, and 11 are rejected under 35 U.S.C. §112, second paragraph, because "unreasonable" is deemed vague and indefinite. Applicants submit that claims 2, 4, and 11, as amended, comply with 35 U.S.C. § 112, second paragraph. Applicants therefore request reconsideration and withdrawal of this rejection.

Rejections under 35 U.S.C. § 102(a)

Claims 1-5 and 8-11 are rejected under 35 U.S.C. §102(a) as being anticipated by Popovic.

Claim 1

Applicants submit that Applicants' claim 1 is not anticipated by Popovic for at least the reasons stated below.

Claim 1 recites a method for simulating relative motion of objects in computer animation. More specifically, claim 1 recites:

> providing a motion of a kinematic object, where the kinematic object is an element of a computer animation display;

providing at least one dynamic object associated with said kinematic object, where said at least one dynamic object is another element of the computer animation display and where motion of said at least one dynamic object is influenced by the motion of the kinematic object, wherein the motion of said at least one dynamic object is simulated using a physically-based numerical technique;

manipulating the motion of said at least one dynamic object in response to the motion of the kinematic object when the motion of the kinematic object exceeds a predetermined threshold;

(Applicants' claim 1, emphasis added)

As recited in claim 1, a dynamic object is provided that is associated with a kinematic object. As claimed, the motion of the dynamic object is influenced by the motion of the kinematic object and the motion of the dynamic object is simulated using a physically-based numerical technique. Further, as claimed, the motion of the dynamic object is manipulated in response to the motion of the kinematic object when the motion of the kinematic object exceeds a predetermined threshold. Accordingly, the motion of the dynamic object is selectively manipulated when the motion of the kinematic object exceeds some threshold. For example, if the kinematic object is a superhero character and the dynamic object is a cape of the superhero, the motion of the cape (dynamic object) is manipulated for example when the acceleration (or velocity or some other aspect of the motion) of the superhero (kinematic object) exceeds 2940 cm/s^2 (as described in paragraph **[0032]** in the specification).

Applicants submit that the above-described concept is not disclosed or even suggested by Popovic. Popovic describes techniques for manipulation of rigid body simulations. It allows the animator to select a body at any time and simply drag the body to desired locations. The system then computes the required physical parameters and simulates the resulting motion. The entire simulation editing process runs at interactive speeds, and thus enables animators to rapidly design complex physical animations. (See Popovic: Abstract, page 209 2nd full paragraph, "Interactive Manipulation" section). Examples are provided and described on pages 214 and 215.

Applicants submit that Popovic fails to teach a kinematic object and a dynamic object where the dynamic object is associated with the kinematic object and where the motion of

the dynamic object is influenced by the motion of the motion of the kinematic object and is simulated using a physically-based numerical technique. In Popovic, the animator explicitly specifies the positions of all the objects. Accordingly, Applicants submit that Popovic fails to teach a dynamic object as recited in claim 1.

Further, as claimed in claim 1, the motion of the dynamic object is manipulated when the motion of the kinematic object exceeds some predetermined threshold. Such selective manipulation of the motion of an object is not taught or suggested by Popovic. As already indicated, in Popovic, the animator explicitly specifies the positions of all the objects and the system simulates the resultant motion. There is no teaching in Popovic to check for threshold conditions and to selectively manipulate the motion of a dynamic object when the threshold conditions are met or exceeded. In fact, Applicants submit that Popovic does not even disclose or refer to any thresholds.

Further, the deficiencies of Popovic are not cured by Thalmann. Thalmann provides a very brief overview of motion control methods (MCMs). However, none of the MCMs disclosed by Thalmann describe a kinematic object and a dynamic object as recited in claim 1, and the concept of selectively manipulating the motion of a dynamic object when the motion of the kinematic object exceeds a predetermined threshold.

In light of the above, Applicants submit that claim 1 is not anticipated by Popovic or Thalmann.

Claims 2-11

Applicants submit that claims 2-11 which depend from claim 1, are also not anticipated by Popovic or Thalmann for at least a similar rationale as discussed for allowing claim 1, and others.

Rejections under 35 U.S.C. § 103(a)

As discussed above, Applicants submit that neither Popovic nor Thalmann discloses a kinematic object and a dynamic object as recited in claim 1, and the concept of selectively manipulating the motion of the dynamic object when the motion of the kinematic

object exceeds a predetermined threshold, as recited in claim 1. Accordingly, Applicants submit that even if Popovic and Thalmann are combined as suggested by the Office Action (even though there appears to be no suggestion or motivation for the combination), the resultant combination would not teach or suggest the features recited in claim 1.

Accordingly, Applicants submit that claim 1 is patentable over Popovic and Thalmann, considered individually or in combination. Applicants further submit that claims 2-11 which depend from claim 1, are patentable over a combination of Popovic and Thalmann for at least a similar rationale as discussed for allowing claim 1, and others.

New Claims 12-20

Applicants have added new claims 12-20 to claim aspects of the present invention. Applicants submit that the new claims are in a condition for allowance, for at least the reasons stated above.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

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